

Maternal smoking and breastfeeding

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العلاقة بين ممارسة الأمهات للتدخين وبين الرضاعة من الثدي

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خلاصة: على مدى شهرين أُجريت دراسة لبحث تأثيرات ممارسة الأمهات للتدخين على الرضاعة من الثدي. فتمت مقابلة 500 من الأمهات مرتين بعد وضعهن، وتم جمع معلومات حول ممارستهن للتدخين وبعض العوامل الاقتصادية والاجتماعية. وبعد تصحيح النتائج بحسب ممارسة الأمهات للتدخين وغير ذلك من عوامل التشويش، أظهرت النتائج أن للتدخين تأثيراً مباشراً على الرضاعة من الثدي. فقد انخفض الإرضاع بدرجة جوهرية بين المدخنات، بينما لم يكن هناك انخفاض جوهري بين عدم المدخنات. وتبين أن للتعليم والمستوى الاجتماعي علاقة إيجابية بمواصلة الإرضاع، وعلاقة سلبية بالتدخين. ونظراً لانخفاض معدل الإرضاع في حالة التدخين، ينبغي حثّ الناس على اجتناب هذه العادة، وخصوصاً في البلدان النامية، حيث يكون الإرضاع من الثدي عاملاً أساسياً في بقاء الأطفال على قيد الحياة.

ABSTRACT A 2-month study was undertaken to investigate the effects of maternal smoking on breastfeeding. A total of 500 mothers were interviewed twice postpartum and information about maternal smoking and sociodemographic factors was collected. After adjustment for maternal smoking and other confounders, results suggested that smoking had a direct effect on breastfeeding. The prevalence of breastfeeding reduced significantly among smokers but there was no significant reduction among non-smokers. Education and social class were related positively to continued breastfeeding but negatively to smoking. Because breastfeeding decreased with smoking, smoking should be discouraged, particularly in developing countries where breastfeeding constitutes an essential child survival measure.

Le tabagisme maternel et l'allaitement

RESUME Une étude d'une durée de deux mois a été réalisée pour examiner les effets du tabagisme maternel sur l'allaitement. Au total, 500 mères ont été interviewées à deux reprises après l'accouchement et des informations concernant le tabagisme maternel et les facteurs socio-démographiques ont été recueillies. Compte tenu du tabagisme maternel et d'autres facteurs parasites, les résultats donnent à penser que le tabagisme a un effet direct sur l'allaitement maternel. La prévalence de l'allaitement maternel diminuait considérablement parmi les mères qui fument et il n'y avait aucune diminution significative chez celles qui ne fument pas. L'éducation et la classe sociale étaient liées positivement à la poursuite de l'allaitement maternel mais négativement au tabagisme. Etant donné que l'allaitement maternel diminue avec le tabagisme, ce dernier devrait être déconseillé, en particulier dans les pays en développement où l'allaitement maternel représente une mesure essentielle pour la survie de l'enfant.

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Introduction

The deleterious effect of smoking on the fetus during pregnancy and the resulting infant morbidity is now well recognized. Infants born to mothers who smoke in pregnancy have lower mean birth weights and higher neonatal mortality rates compared with those born to non-smokers [1,2]. Other studies have indicated that perinatal exposure to nicotine is associated with adverse reproductive outcomes, including altered neural structure and functioning, cognitive deficits and behaviour problems in offspring and conduct disorders in male offspring [3]. Smoking is associated with increased risk of infertility, premature delivery, spontaneous abortion, and fetal and perinatal death. Sudden infant death syndrome has also been linked to maternal smoking during pregnancy [4].

Because less is known about the effect of maternal smoking on lactation or duration of breastfeeding, our study focused on the influence of cigarette smoking on breastfeeding. Breast milk has a protective effect against many infectious diseases, especially diarrhoea [5]. This protection is particularly important in developing countries where hygiene conditions are poor [6].

The effect of maternal smoking on breastfeeding duration was first described by Mills in 1950 [7]. Recent studies have shown that smoking reduces daily milk output by approximately 250–300 ml [8,9]. The probable mechanism for this is the increase of dopamine secretion in the hypothalamus leading to a decrease in prolactin production [10–15]. Women who smoke cigarettes are more likely than non-smokers to attribute early weaning to low milk volume [16]. A report from Chile indicates that mothers who smoked and delivered term infants produced significantly less milk than mothers who did not smoke [8].

In this study we compared breastfeeding prevalence and sociodemographic factors between smoking and non-smoking mothers.

Subjects and methods

Data were collected in a primary health care centre in Aqaba over 2 months in 1998. A sample of 500 mothers was selected according to certain criteria from those coming for routine vaccination of their infant. The mothers were of similar age and parity and were housewives. Their infants had been delivered at full term and the deliveries were normal. Infants who needed an extended hospital stay after delivery because of prematurity, sepsis, certain congenital abnormalities or other complications were excluded from the study.

The selected mothers were interviewed on two occasions, first at 2 months postpartum and again at 4 months postpartum. A standardized, pre-coded questionnaire was used that covered maternal age, parity, monthly income of the family, number of years of education of the mother, feeding method, smoking history including daily number of cigarettes smoked and presence of other smokers in the household, infant birth weight and maturity, use of combined contraceptives post-delivery, prior nursing experience and mother's desire to breast-feed.

The smoking group comprised mothers who smoked during their pregnancy and continued to do so after delivery. Smokers were defined as persons consuming one or more cigarettes daily. Social class was classified into high, middle and low socioeconomic groups according to the monthly income of the family. These groups were

then assessed with maternal and child health indicators.

Breastfeeding history was recorded at 2 months and 4 months postpartum and the smoking and non-smoking groups of mothers were compared for age, parity, infant birth weight, use of contraceptives, previous breastfeeding experience and desire to breastfeed. Breastfeeding prevalence was also compared for smokers and non-smokers according to socioeconomic group and mother's education.

The statistical analysis used in the study was the χ^2 test and the Student *t*-test. *P*-value < 0.05 was considered statistically significant.

Results

Maternal characteristics are listed in Table 1. There were no statistically significant differences between smokers and non-smokers when compared for age, parity, prior lactation, desire to breastfeed and use of combined contraceptives. The mean birthweight of babies born to smokers was 2.9 kg and to non-smokers 3.2 kg, which was statistically significant (*P* < 0.01).

Of the 500 mothers included in the study, 93 were smokers (Table 2). At 2 months postpartum only 63% of the smokers breastfed their infants compared with 90% of non-smokers. The prevalence of breastfeeding among smokers decreased to

Table 1 Maternal characteristics

Characteristic	Smokers (n = 93)	Non-smokers (n = 407)	<i>P</i> -value
Mean age (years)	24	26	NS
Primiparas No. (%)	32 (34)	163 (40)	NS
Prior lactation No. (%)	55 (59)	250 (61)	NS
Desire to breastfeed No. (%)	82 (88)	370 (91)	NS
Use of combined contraceptives No. (%)	29 (31)	122 (30)	NS
Mean infant birth weight (kg)	2.9	3.2	< 0.01

NS = not significant

43% (*P* < 0.001) at 4 months, whereas among non-smokers, breastfeeding at 4 months was 88%, i.e. there was no significant decrease.

The prevalence of breastfeeding among smokers and non-smokers in relation to mother's education is given in Table 3. We identified four levels of education according to the number of years of education. Mothers with higher education related positively to breastfeeding but negatively to smoking (*P* < 0.001). Among mothers who

Table 2 Prevalence of breastfeeding at 2 months and 4 months postpartum

	No.	At 2 months (%)	At 4 months (%)	<i>P</i> -value
All mothers	500	80	65	< 0.001
Smokers	93	63	43	< 0.001
Non-smokers	407	90	88	NS

NS = not significant

Table 3 Prevalence of smoking and breastfeeding in relation to mother's education

No. of years of education	Smoking		Breastfeeding				P-value
	No.	%	Smokers		Non-smokers		
			No.	%	No.	%	
≤ 6	35/93	32	15/35	43	119/141	84	< 0.001
7-12	29/93	27	21/29	72	136/148	91	< 0.001
13-16	22/93	20	17/22	77	95/102	93	< 0.001
≥ 17	7/93	6	6/7	86	15/16	94	< 0.001

Table 4 Postpartum breastfeeding and maternal smoking history

Mothers	No.	Postpartum breastfeeding				P-value
		At 2 months		At 4 months		
		No.	%	No.	%	
Smokers						
<10 cigarettes daily	53	37	70	25	47	< 0.001
>10 cigarettes daily	40	22	55	16	40	< 0.001
Non-smokers	407	365	90	360	88	NS

NS = not significant

had received ≥ 17 years of education only 6% smoked. Of these more highly educated mothers, 86% of smokers and 94% of non-smokers breastfed ($P < 0.001$).

Breastfeeding prevalence and duration was dependent upon the daily number of cigarettes smoked by the mothers (Table 4). Mothers who smoked less than 10 cigarettes daily had a higher prevalence of breastfeeding (70% at 2 months, 47% at 4 months) compared with those who smoked more than 10 cigarettes daily (55% at 2 months, 40% at 4 months postpartum) ($P < 0.001$).

Breastfeeding by smoking and non-smoking mothers in each socioeconomic group at 2 months and 4 months postpartum are compared in Table 5. Higher social class was related positively to continued

breastfeeding. Among those of the high socioeconomic group, 80% of smokers and 97% of non-smokers breastfed. Among the low socioeconomic group, however, only 53% of smokers and 75% of non-smokers breastfed ($P < 0.05$).

Discussion

In countries where smoking has declined among women, it has become increasingly associated with economic and social disadvantage. Although smoking was first adopted by the more affluent and educated women, these women were also the first to give it up. The female smoker is now more likely to have limited education, have a lower status job or be unemployed, have a

Table 5 Smoking and postpartum breastfeeding according to socioeconomic group

Socio-economic group	Monthly income (US\$)	Breastfeeding at 2 months				Breastfeeding at 4 months				P-value
		Smokers		Non-smokers		Smokers		Non-smokers		
		No.	%	No.	%	No.	%	No.	%	
High	> 550	12/15	80	66/68	97	9/15	60	66/68	97	< 0.05
Middle	250-550	31/48	65	226/242	93	22/48	46	224/242	92	< 0.05
Low	≤ 250	16/30	53	73/97	75	10/30	33	70/97	72	< 0.05

low income and be single, separated or divorced [4].

Breastfeeding mothers who smoke are known to wean their infants sooner than breastfeeding mothers who do not smoke. Various reasons have been given for stopping breastfeeding, such as an unsettled baby or inadequate milk volume [17].

The physiologic basis for low milk production in smoking mothers may be due to several factors, which include lower basal prolactin levels due to an increase of dopamine secretion in the hypothalamus [10,12,13,15]. Reduced prolactin levels during pregnancy may inhibit mammary development and lactation capacity. Increased milk yields in humans have been associated with reduced somatostatin levels after episodes of suckling [18]. In breastfeeding women who smoke, somatostatin levels are elevated and plasma levels increase rather than decrease in response to suckling [11].

Low milk volume and low milk fat concentrations may explain the early weaning of breastfed infants by mothers who smoke cigarettes [9]. The prevalence of breastfeeding was lower among women who smoked than among women who did not smoke. When comparing breastfeeding in smoking mothers according to socioeco-

nomie group and educational level, higher social class and education were related positively to breastfeeding and negatively to smoking. The present study also indicated that the number of daily cigarettes smoked by mothers was related negatively to breastfeeding as has been confirmed by other studies [19].

We did not study environmental tobacco smoke (ETS) as a risk factor with smoking in reduced breastfeeding, but recent studies have indicated that ETS can lead to reduced breastfeeding duration [20-23]. This effect has not yet been confirmed and additional studies are warranted in order to do so.

Conclusion and recommendations

We found that breastfeeding decreased with smoking. Women should be advised not to smoke during and after pregnancy. If stopping smoking is not possible, the daily number of cigarettes should be reduced to a minimum. This is particularly relevant for women in less developed countries where smoking is increasingly common and where breastfeeding is an essential measure for child survival.

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Framework Convention on Tobacco Control

The World Health Assembly, the governing body of the World Health Organization, unanimously decided to open the negotiation process on the Framework Convention on Tobacco Control (FCTC) — a new legal instrument that will address issues as diverse as tobacco advertising and promotion, agricultural diversification, smuggling, taxes and subsidies. In Committee discussions on 22 May 1999, a record 50 nations took the floor to pledge financial and political support for the FCTC including the five permanent members of the United Nations Security Council, major tobacco growers and exporters, as well as several countries in the developing and developed world which face the brunt of the tobacco industry's marketing and promotion pitch.

Source: WHO Press release WTA/18, 25 May 1999